FIG. 1

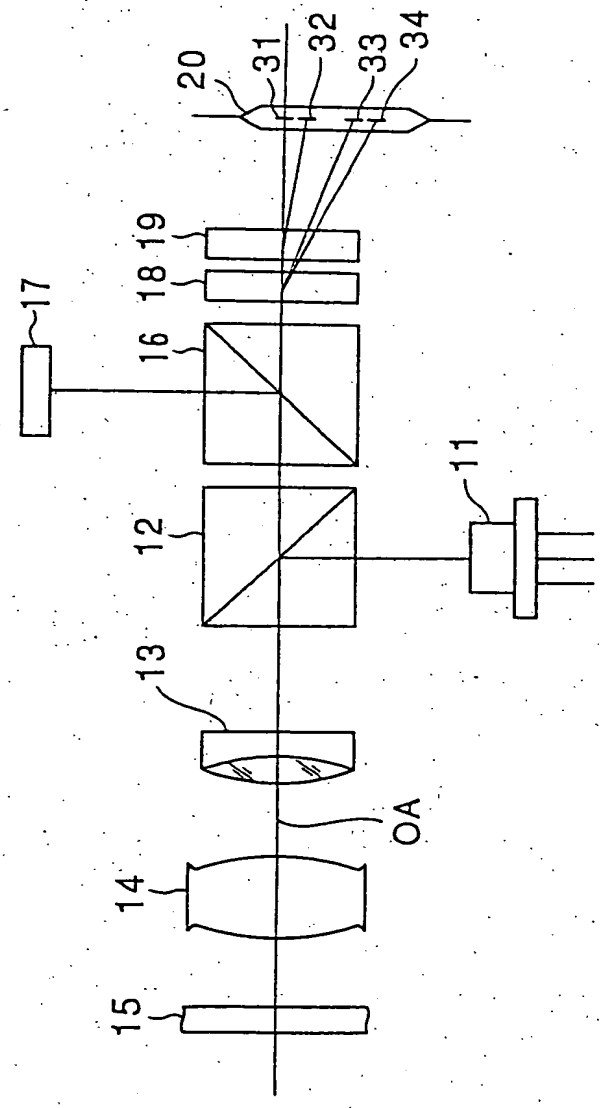


FIG. 2

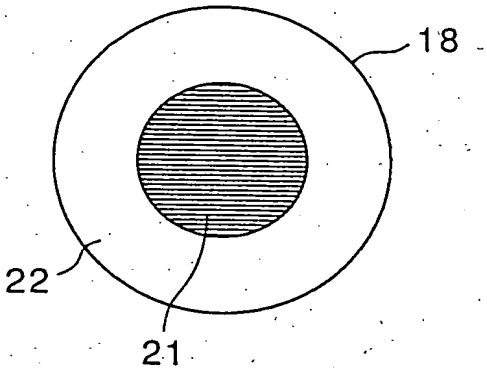


FIG. 3

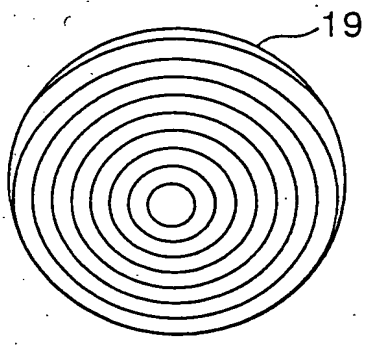


FIG. 4

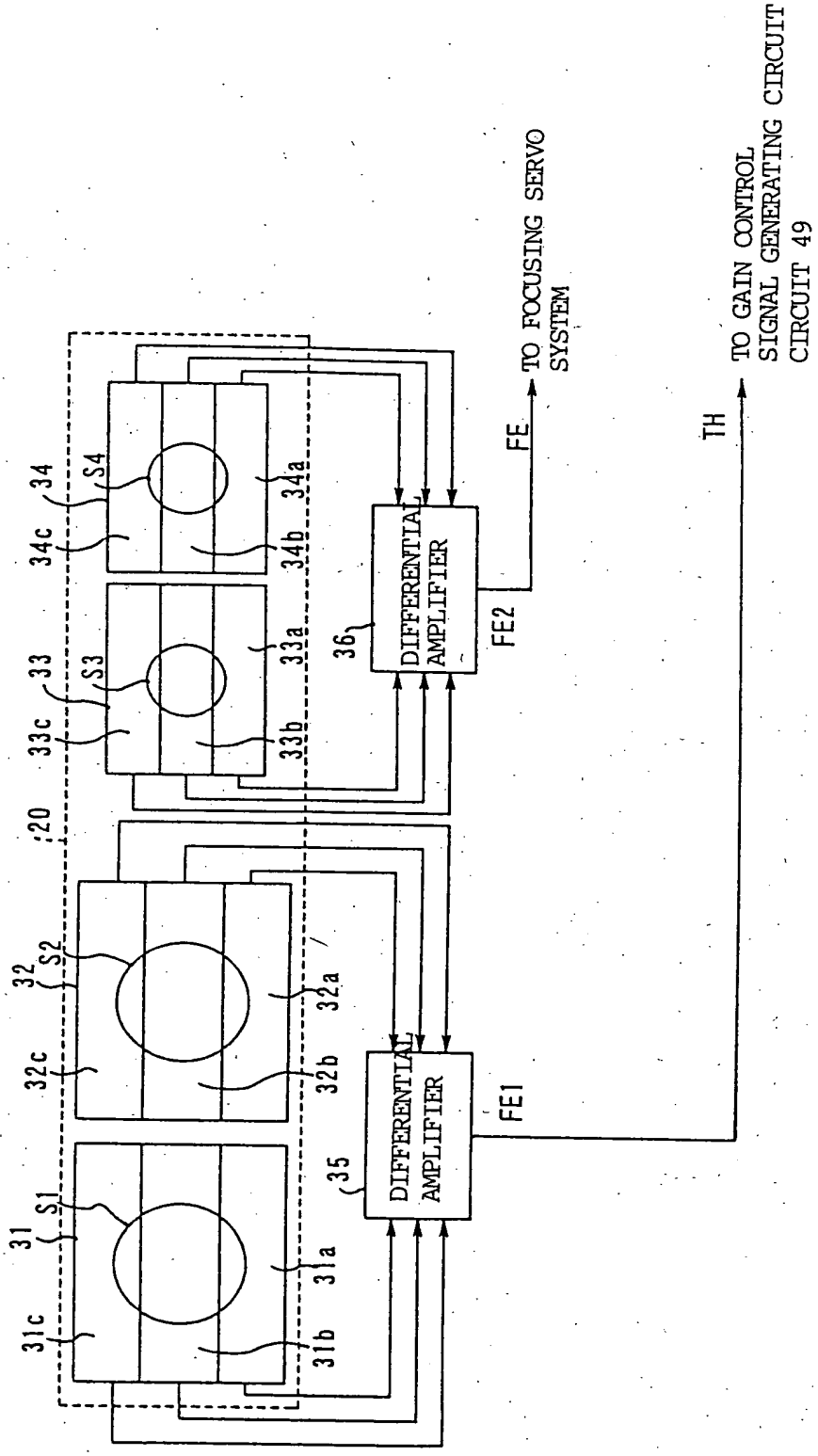

20
31
S1
31a
31b
31c
35
DIFFERENTIAL AMPLIFIER
FE1
32
S2
32a
32b
32c
33
S3
33a
33b
33c
36
DIFFERENTIAL AMPLIFIER
FE2
34
S4
34a
34b
34c
FE
TO FOCUSING SERVO SYSTEM
TH
TO GAIN CONTROL SIGNAL GENERATING CIRCUIT CIRCUIT 49

FIG. 5

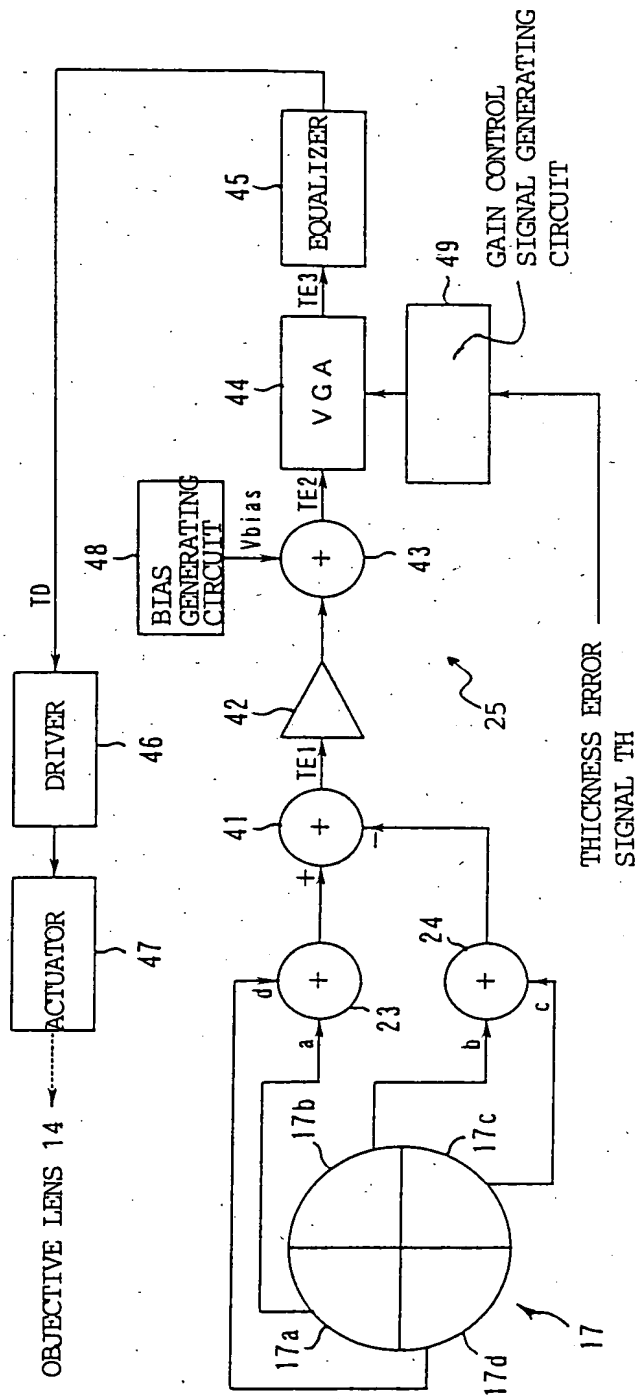

OBJECTIVE LENS 14
ACTUATOR
47
DRIVER
46
TD
45
EQUALIZER
TE3
44
VGA
49
GAIN CONTROL SIGNAL GENERATING CIRCUIT
48
BIAS GENERATING CIRCUIT
Vbias
TE2
43
42
TE1
41
25
THICKNESS ERROR SIGNAL TH
23
24
a
b
c
d
17
17a
17b
17c
17d

FIG. 6

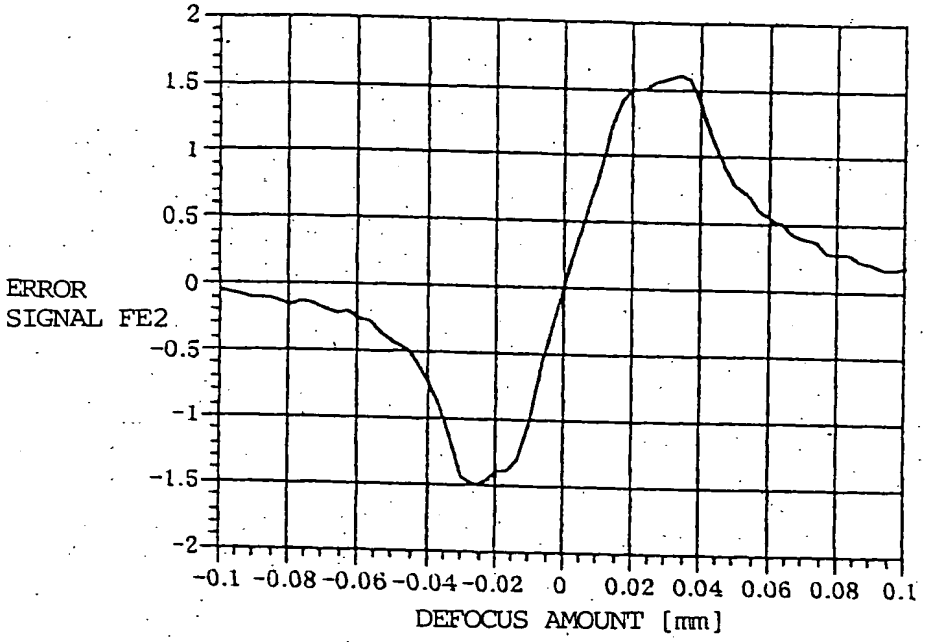

ERROR
SIGNAL FE2
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
-0.1 -0.08 -0.06 -0.04 -0.02 0 0.02 0.04 0.06 0.08 0.1
DEFOCUS AMOUNT [mm]

FIG. 7

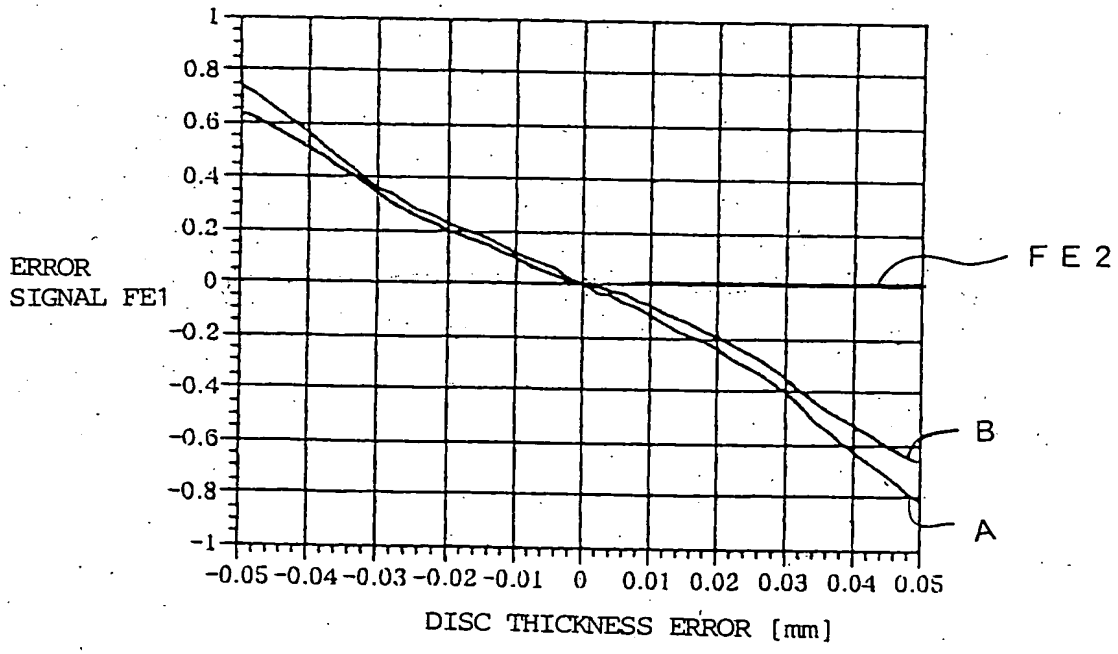

ERROR
SIGNAL FE1
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-0.05 -0.04 -0.03 -0.02 -0.01 0 0.01 0.02 0.03 0.04 0.05
DISC THICKNESS ERROR [mm]
FE2
B
A

FIG. 8A

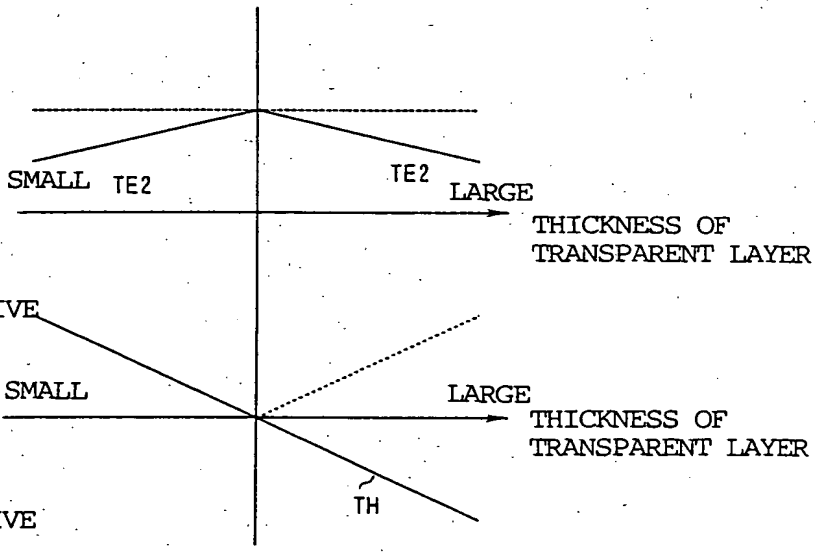
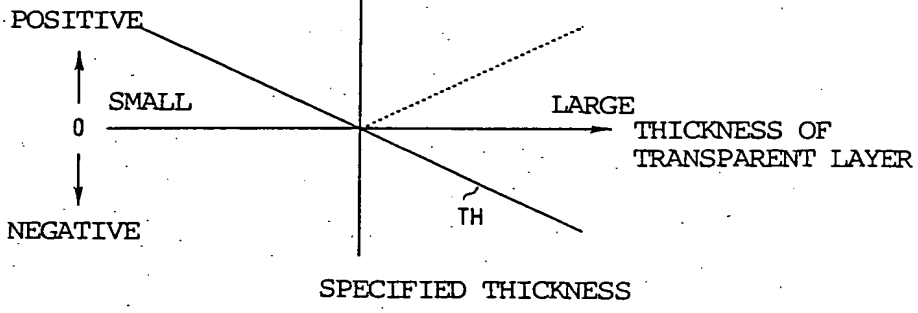

SMALL
TE2
TE2
LARGE
THICKNESS OF
TRANSPARENT LAYER

FIG. 8B


POSITIVE
SMALL
0
LARGE
THICKNESS OF
TRANSPARENT LAYER
TH
NEGATIVE
SPECIFIED THICKNESS